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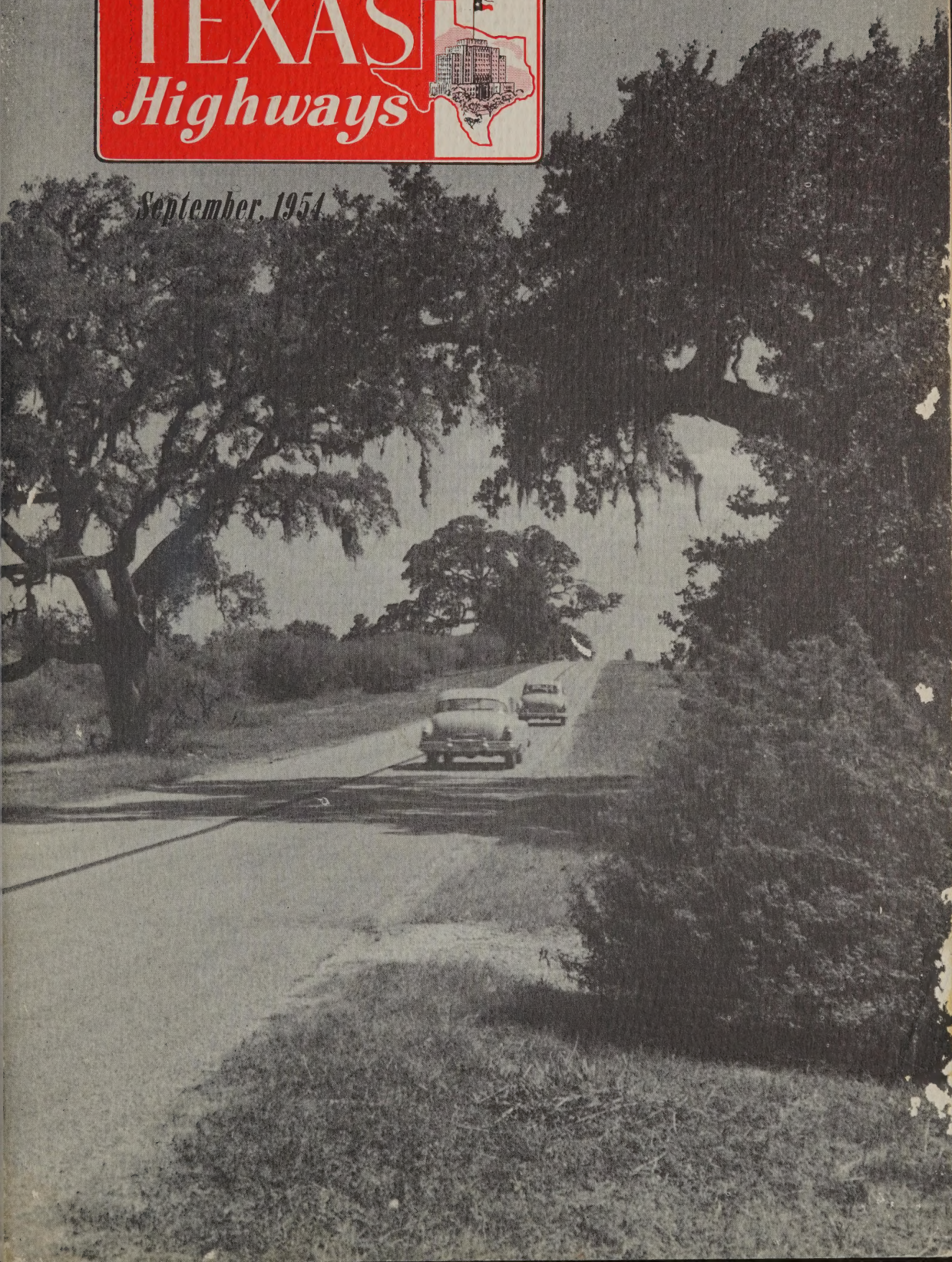
TEXAS Highways

September, 1954



DO YOU KNOW TEXAS?

These girls know how to ride horses, but not all Texans do. In fact, most of them feel much more at home behind a steering wheel than in a saddle. Despite the fact that Texas is known as the cattle empire, a larger percentage of the people in other states are better acquainted with ranch life than are Texans.

And it's really a shame, too, since the healthful climate, sunny skies, and natural beauty of Texas ranches make them ideal for anyone who likes outdoor activities.

Guest ranches provide one way for Texans to learn about the "wild and woolly West." These differ from dude ranches in that they are actual working ranches which rent out a few rooms to those wishing to participate in the affairs of real ranch life.

Like this one in Big Bend National Park, they give dudes -- Texans or otherwise -- a wonderful opportunity to learn what a genuine ranch is like.

About the Cover . . .

September is a month of change for everyone. Even though hot weather is still with us, we are at least promised a change by weather bureau savants. Small fry go back to schools, college football brings out many motorists, and plans for winter upkeep on our highways are begun.

During September the number of tourists entering the state over our highways continues unabated, and many of those spending the winter in the "Magic Valley" are already arriving.

In the districts, plans are being made for the transition from summer to winter maintenance work, and projects begun during hot weather are being finished. Before we know it, we will be warning travelers of ice on bridges, and in the Panhandle districts, where "there's nothing between them and the North Pole but a barb wire fence," the snow plows will be unlimbered to clear the roads after a Blue Norther.

Pictured is a stretch of U. S. 77A-183 near Refugio.

VOL. I

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TEXAS Highways

The purpose of this publication, "Texas Highways," is to furnish a medium for presenting practical ideas and information. Employees are invited and urged to submit suggestions and relate experiences which would benefit or be of interest to Highway employees. These conclusions and data are not necessarily endorsed by the Highway Department nor are they to be construed as instructions.

Photographic services are available and other assistance may be obtained, if desired, in preparing material for submission. All material and comments should be directed to the Information and Statistics Division, Austin 14, Texas.

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COMPILED AND EDITED
Information and Statistics Division

GRASS PLANTER

George P. Munson Jr., District Maintenance Engineer
District 12

It is a generally recognized fact that a covering of St. Augustine grass on our highway rights of way is very desirable in those localities where this grass grows well. St. Augustine grass requires little mowing, chokes out undesirable vegetation, is difficult to burn, and presents a pleasing appearance. One difficulty encountered in establishing a growth of St. Augustine grass is the necessity of maintaining an adequate supply of moisture for the roots. Where planting is done in such manner that the roots are exposed to the air, the grass usually dies before growth can begin.

Vernon M. Frank of Houston, who is not an employee of the Highway Department, has invented a device for transplanting St. Augustine grass. This device might be used for other grasses, but has not been tried for other than St. Augustine in this district. As a public service, Mr. Frank has permitted the Highway Department to make and use this equipment without charge. This grass planter provides a quick, economical method for transplanting grass complete with the existing root structure and soil surrounding the roots. The method excludes the air from the roots, cuts down evaporation, and usually insures a healthy growth, even in dry periods.

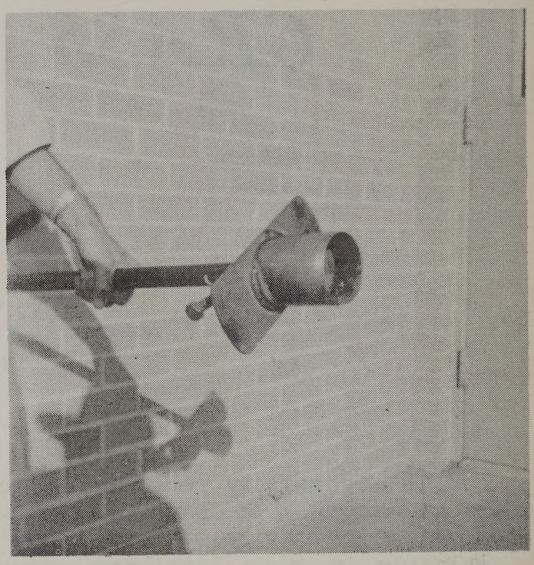
The planter can be easily made by any welder using salvaged materials. This device consists essentially of a short section of three-inch tubing connected to a handle with a suitable foot plate and ejecting piston. The handle is made of 3/4-inch pipe, 30 inches long, with an eighteen-inch long cross bar welded to one end. The other end is slotted 3/4 by 4 inches before it is welded to a 4 by 8 by 1/2 inch foot plate. A cutter made of a section of three-inch diameter tubing, three inches long, is welded to the bottom of the foot plate. The piston consists of a 3/4-inch diameter rod, seven inches long, welded to a 2-13/16 by 3/4 inch disk. The rod is drilled and tapped for a 5/8-inch diameter bolt. The piston is inserted, rod foremost, into the cutter so that a 5/8-inch bolt may be inserted through the handle slot and screwed into the rod. This

bolt serves two purposes, the most important of which is to provide a lever to force the piston down and eject the grass cylinder. The second purpose is to secure the piston in the cutter.

The first requirement for transplanting grass is the location of a source of healthy grass of the type desired. The grass must have a dense root system. This method is very unique in that grass may be obtained from sources that would not ordinarily be used, because this process does not leave any unsightly scars to mar the appearance of the parent source.

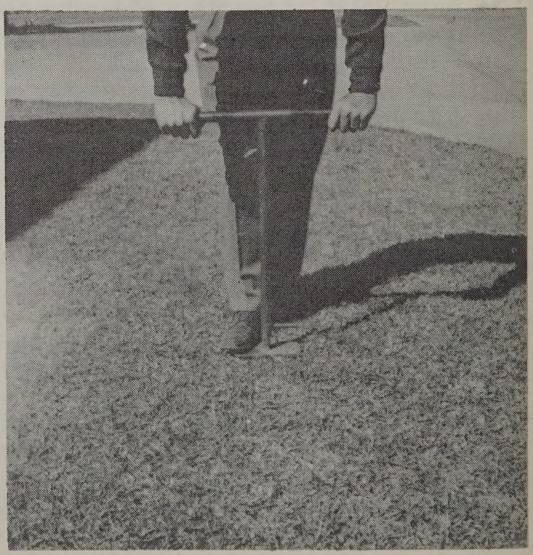
The grass is obtained by pushing the cutter into the sod with the foot. As the cutter is removed, it retains a cylinder of grass, roots and soil. This is then ejected on to the ground and placed in a five-gallon bucket. A discarded paint bucket is normally

Side view of grass planter.

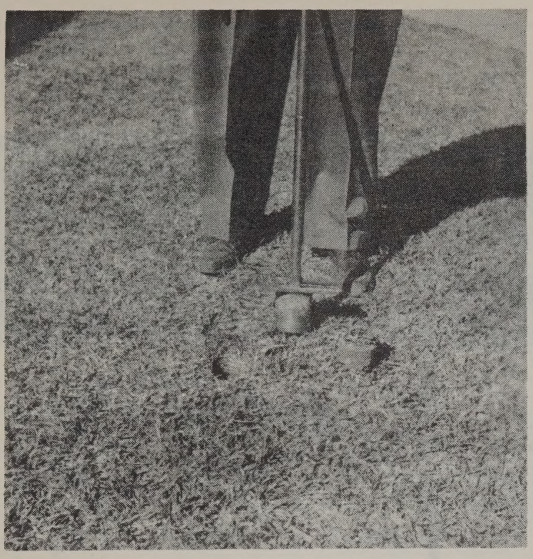


End view, showing cutting cylinder.

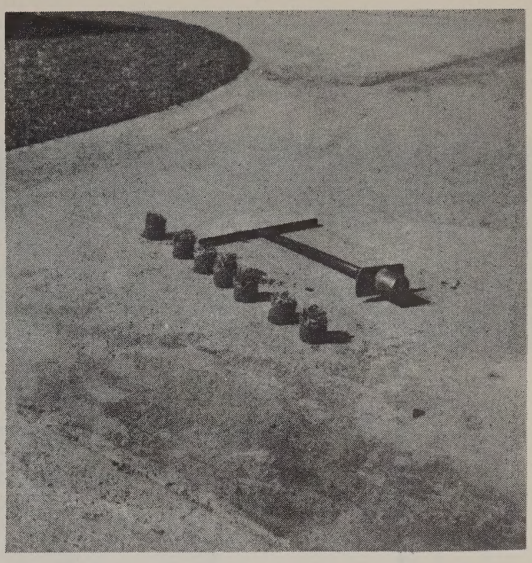
Pressing grass planter into sod.



Planter pressed full depth into sod.



Planter removed from hole with ejected cylinder of sod.



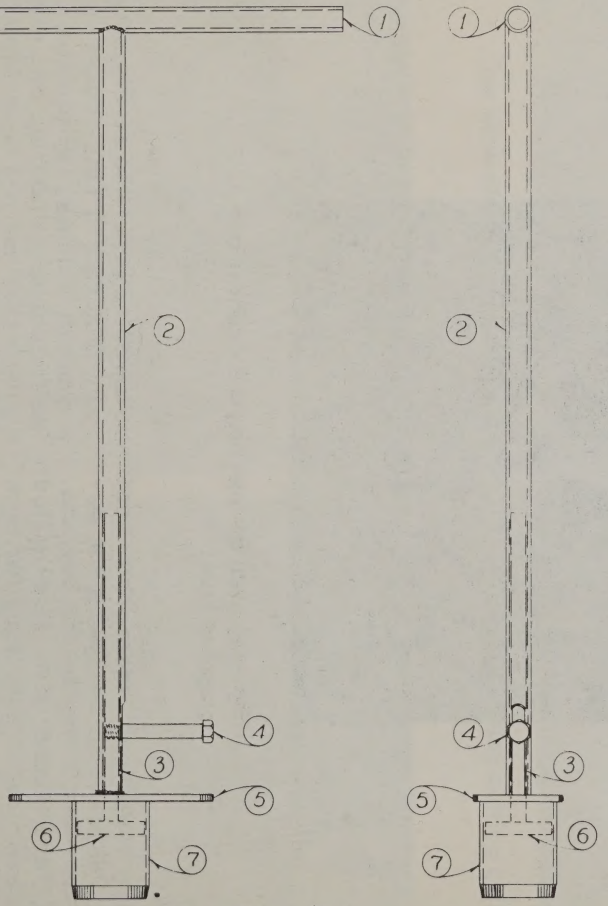
Grass planter with sod cylinders.

Planting grass by inserting sod cylinder into prepared hole.

used. A two-man team can best utilize the planter, one using the device, the other carrying the buckets. It has been found that five-gallon buckets are most satisfactory for both collecting and planting the grass.

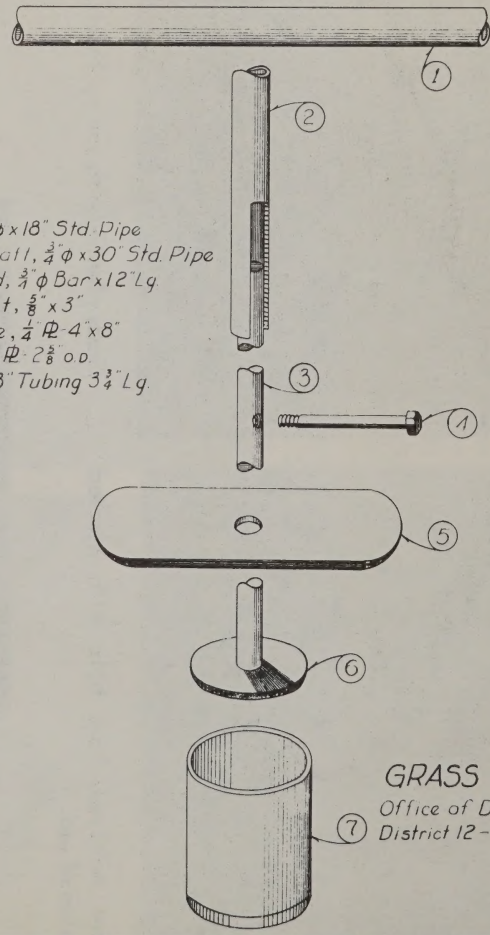
In planting the grass, the device is used to cut holes in the ground for placement of the grass cylinders. As the holes are made, a cylinder of the grass is dropped into place. The cylinder of earth removed may be left on top of the ground to be disintegrated by the next rain. This process leaves a smooth surface, eliminates slow, inefficient hand planting, and provides a grass that has not been damaged by drying of the roots.

A total of 40 of these grass planters are now in use in District 12, and a large percentage of the grass thus transplanted in this district has been successful, with a substantial saving in time and labor cost.



Scale: $\frac{1}{4}$"-1'

1. Handle, $\frac{3}{4}$"ϕ x 18" Std. Pipe
2. Handle Shaft, $\frac{3}{4}$"ϕ x 30" Std. Pipe
3. Piston Rod, $\frac{3}{4}$"ϕ Bar x 12" Lg.
4. Piston Bolt, $\frac{5}{8}$" x 3"
5. Foot Plate, $\frac{1}{4}$" PL-4" x 8"
6. Piston, $\frac{1}{2}$" PL-2$\frac{5}{8}$" o.d.
7. Cylinder, 3" Tubing 3$\frac{3}{4}$" Lg.



GRASS PLANTER

Office of District Engineer
District 12 - Houston, Texas

NEW TRAVEL INFORMATION BUREAU

G.A. Youngs, District Engineer
District 19

With the opening of the Highway Department's new Travel Information Bureau on U.S. 80 at Waskom another milestone in service to the traveling public was passed. Completed and occupied in June, the new Waskom station was designed only after considerable study into what would best serve to stimulate travel and aid those touring the state.

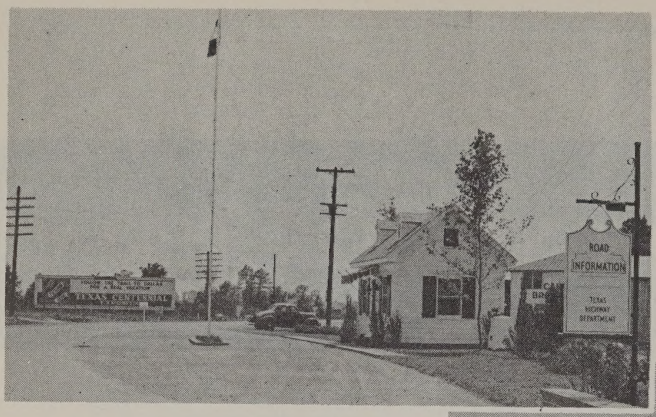
The Department's seven travel bureaus had their beginnings in 1936 during the Texas Centennial when they were opened to give directions and information to tourists coming to the state for the celebrations. The few that were put into operation at that time proved to be so popular with the traveling public that the Department continued to operate them after the close of the festivities. With the exception of the war years, from 1942 to 1946, they have been going strong ever since.

The new building at Waskom was carefully designed to blend with the usual conception of Southwestern architecture, using sandblasted shiplap and open rafters for interior finish. The Information and Statistics Division made a thorough study of the functions and needs, both present and future, of the station so that a building might be designed which would be functional and attractive. A final plan was then given to the architect, V. G. Curtis, of D-18 in the Austin office, who designed the building.

The exterior trim is locally made Waskom brick, and hidden structural members are salvaged bridge stringers. The landscaping of the grounds was under the supervision of John Blasingame, Senior Landscape Adviser. The station was built on a day labor force account basis, using District 19 personnel for practically all phases of construction, which greatly reduced the cost. The advanced planning and securing of material was handled by F.A. Sims, Office Engineer, and Roy Johnston, Senior Maintenance Superintendent. Actual construction was under the direct supervision of Bill Coleman and his bridge crew. Plumbing and electrical work were done by L. T. Pilant, Construction Foreman, and cabinet work was done in the sign shop under the supervision of C.J. Pilant, Construction Foreman. The district personnel have offered several practical suggestions which will not only cut the cost of future buildings, but will enable the districts to use more materials and labor at hand.

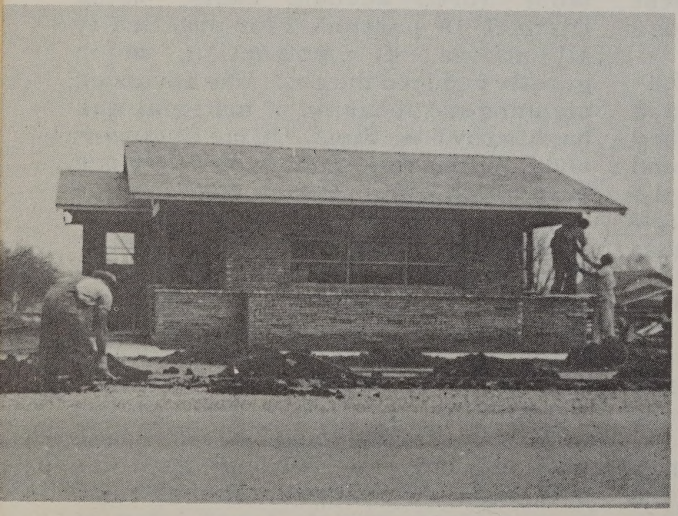
It is planned to use the same design as it becomes necessary to replace the existing buildings now in use throughout the state. District 19 is the only district in the state with two bureaus at present. Since the completion of the Waskom station, another is now under construction in Texarkana.

All of the stations are manned by

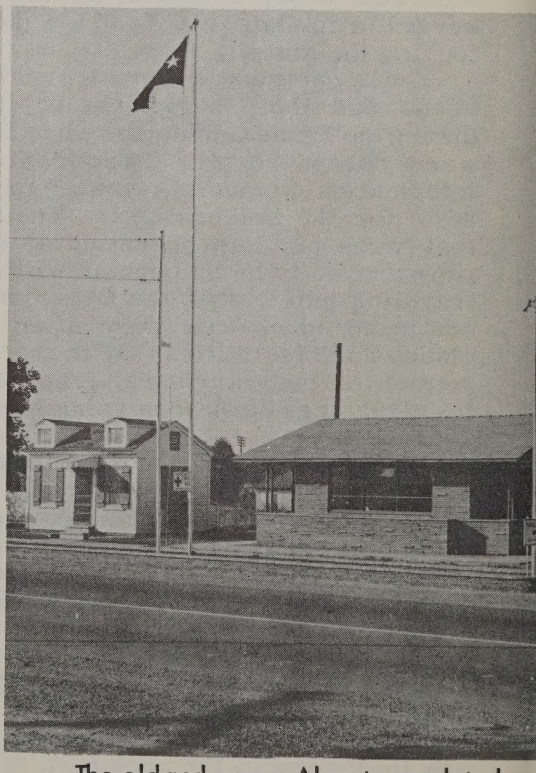


Where it all began. Note billboard in left background advertising the Centennial Exposition. This photo was made in 1936.

The old station while it was in use. Unsightly old shed stood approximately where new bureau is now located.



District personnel at work on construction of new building.



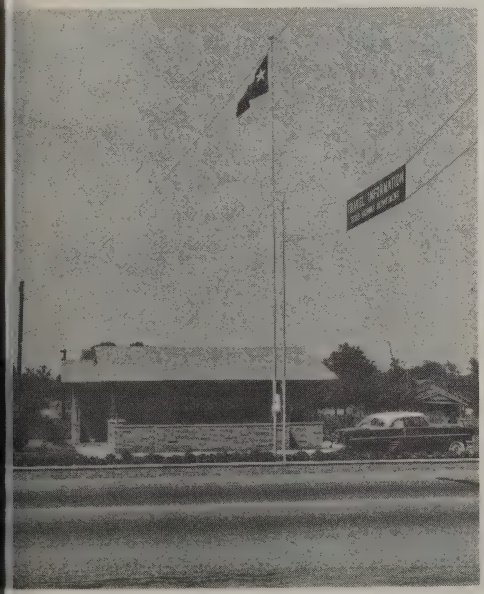
The old and new - Almost completed new station stands beside old bureau which was later moved to District 19 office grounds.

one supervisor and two attendants who are dressed in western uniforms from cowboy boots to ten-gallon hats. Open from seven in the morning until seven in the evening, seven days a week, the bureaus are closed for only a few days during the Christmas holidays. Several years ago the Department operated a number of stations, some of which were open only during the summer, but this proved too confusing to tourists entering the state, so the summer-operated stations were discontinued.

The primary objects of the Travel Information Bureaus are to promote good will for the State of Texas and to increase tourist travel in the state. A variety of service is offered. All of the personnel go through a special training course which teaches them to give clear directions that are easy to understand and follow. Each attendant must also be well versed in the history and folklore of the state, and must have that special "something" which enables them to remain smiling and courteous no matter how much they are badgered during a long day of helping other people. Visitors are furnished with maps marked with the route they wish to travel, and descriptive literature on points of interest in the state is furnished without cost. All bureau personnel are trained in first aid, and several of the managers instruct courses in their local communities.

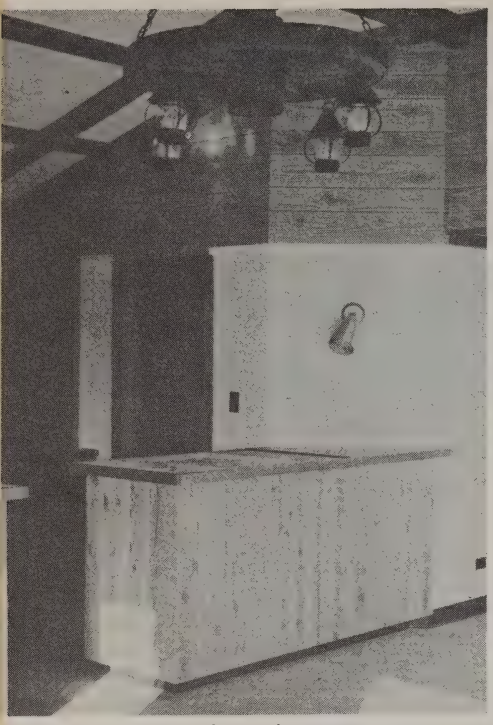
A few years ago the districts, with the exception of 3 and 24, had the bureaus in their districts begin the issuance of overweight and overdimensional permits for trucks. Because of the ideal locations of the stations and their existing facilities, they are used for offering this additional service.

Last year the seven bureaus, located at Orange, Waskom, Texarkana, Denison, Wichita Falls, Canutillo, and Laredo, played host to approximately one-half million people. The stations were able to increase the average itinerary of travel in Texas of tourists stopping for services by approximately 12 per cent — that is, the average tourist traveled 12 per cent more miles in the state than



Newest addition to the Travel Information Bureaus. Similar design will be used on all future construction of these stations.

Exterior, with landscaping partially completed. Note attractive siding, using bricks manufactured in Waskom.



The cabinet work in the new station was done by District 19 sign shop personnel.

Interior of new bureau showing sandblasted shiplap and open rafters.

originally planned. In terms of money, this meant that tourists were persuaded to spend nearly $100 thousand extra as a result of these services.

Another function of the bureaus is the collecting of statistics for use in compiling the Department's annual tourist industry survey. Data is taken from travelers concerning their likes, dislikes, expenditures, length of stay, and mileage traveled. Each out-of-state tourist stopping for service is issued a survey card addressed to and postpaid by the Highway Department, and is asked to fill in the card with certain facts concerning his stay in Texas. Visual counts are made of out-of-state cars, and every sixth day a record of each stop is kept. All of these data, together with statistics compiled by other branches of the Department, are used to make up the annual Tourist Industry Report issued by the Department.

Many far-sighted planners realized years ago that a highway department's responsibility to the people it serves should not end with the providing of an all-weather road surface. It was seen and realized that safety, economy, and pleasure were three prime factors to be considered in the construction, maintenance, and operation of a highway system.

Texas has gained the respect of motorists from all over the country for not only having a Class A system of roads, but also for many special conveniences such as roadside parks and Travel Information Bureaus, which add to the pleasure of motorists.

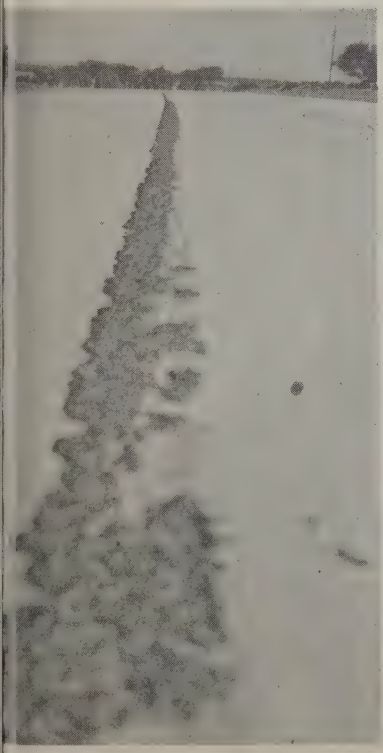
The purpose of the Texas Highway Department is to build and maintain highways. However, without the good will and support of the public, we cannot efficiently accomplish this purpose. The little extras we throw in such as the information bureaus, roadside parks, and other special features are to our highways as icing is to a cake. The bureaus are not only instrumental in generating revenue as a result of stimulating travel to and within the state, but also play a vital role in creating a greater highway consciousness and appreciation among the traveling public, all of which is essential in the road-building field.

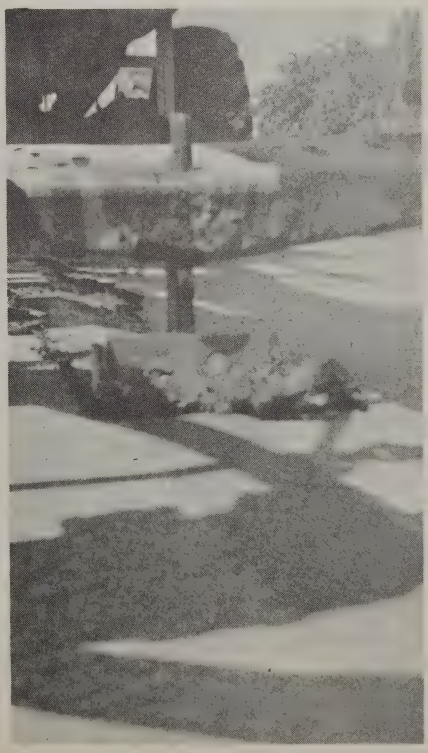
CENTER STRIPE REMOVER

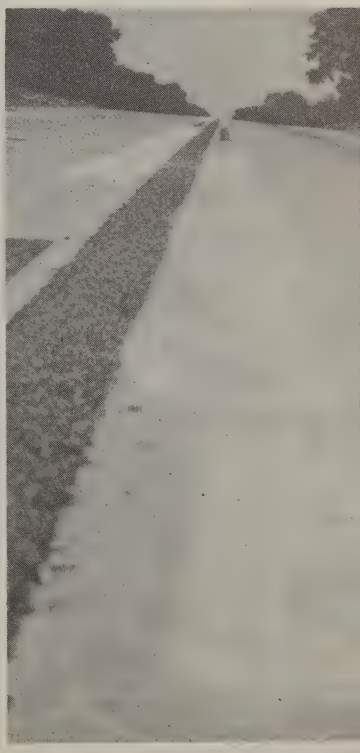
B.R. Wood, Senior Maintenance Foreman
District 15

We have, in the past, encountered difficulty in finding a way to remove old rock center strip from concrete pavement without leaving partially cut strips in the slight depressions of pavement. We needed a much shorter blade than any we had to reach into these depressions. By using an old scarifier tooth and welding a one by three by nine inch metal block crosswise of the point and cutting two holes three inches apart in the face of the block, thus providing a place to bolt a nine-inch blade cut from each end of an old, worn grader blade, we found that these blades would cut for quite a distance. In using this, extra blades should be provided which can be changed very quickly.

We find that this tool is very effective for removing paint dash stripe, also.







EXPERIMENTAL ASPHALT SURFACE TREATMENT

M.B. Hodges, District Engineer
District 22

All who are interested in and connected with asphalt surface treatments know that for many years much has been written, and much more said, about the various types of aggregates used, and the results obtained. There are some few who insist, and with good and valid reasons for their opinion, that the type of aggregate used has no bearing on the results, but that the time and method of application are the controlling factors. There are many others who insist that the type of aggregate used is the controlling factor in the results. We all know from many years of practical experience that, very likely, all factors are involved.

With the above in mind, some three years ago B. B. Freeborough, formerly Engineer of Land Service Roads and now representing the Asphalt Institute, approached the writer and suggested some experimental work be done in District 22. His primary thought was that by the use of an aggregate with an excellent affinity for asphalt, comparable results could easily be obtained with the use of lesser amounts of asphalt.

In the summer of 1951 four short sections of a double bituminous pavement, generally referred to as a split single, were placed on an existing pavement on U. S. 90 just east of the Pecos River in Val Verde County. The usual specifications for this type of pavement require the use of 0.50 gal./sq. yd. of oil asphalt with 0.20 gallon for the first application and 0.30 gallon for the second. On the four sections the asphalt and stone were applied in the amounts noted in the following table:

SEC. NO.	ASPHALT 1st. Appl.	ASPHALT 2nd. Appl.	STONE Gra. 1	STONE Gra. 7
1-a	0.255	0.204	1:74	1:133
1-b	0.255	0.156	1:74	1:133
2-a	0.204	0.204	1:74	1:133
2-b	0.204	0.156	1:74	1:133

From the above you will note that the asphalt varied from a maximum of 0.459 to a minimum of 0.360 gal./sq. yd. Results were very favorable on all four sections, although as lesser amounts of asphalt were used on the second application, the greater was the loss of the Grade 7 aggregate. This was due to the fact that the amount of asphalt was not sufficient to fill the voids and leave a sufficient amount to retain the stone.

This particular feature had been discussed with Mr. Freeborough by the writer, as it was the writer's opinion that the first application should be at a very minimum and the second should be appreciably heavier for the reasons noted above.

In the summer of 1952, a second experimental section was placed on Farm Highway 117 some three miles south of Uvalde in Uvalde County. On the four sections the asphalt and stone were applied in the amounts noted in the following table:

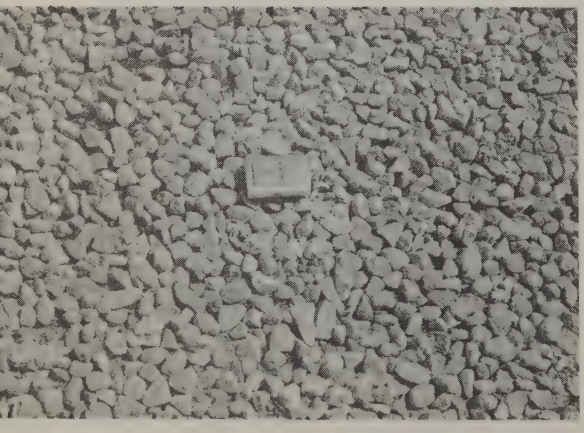
SEC. NO.	ASPHALT 1st. Appl.	ASPHALT 2nd. Appl.	STONE Gra. 1	STONE Gra. 7
1-a	0.155	0.295	1:77	1:101
1-b	0.155	0.251	1:77	1:101
2-a	0.111	0.295	1:77	1:101
2-b	0.111	0.251	1:77	1:101

A section of F.M. 1867 after a prime of MC-1 asphalt was applied at a rate of 0.25 gal./sq. yd. The caliche-gravel base laid by the contractor provided a very smooth base for the entire experimental double asphaltic surface treatment project.

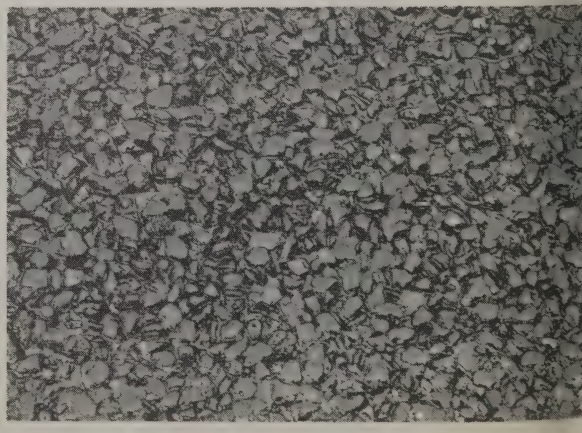
Application of the first course of asphalt, OA-175, at a rate of 0.1109 gal./sq. yd. The theoretical rate was 0.10 gal./sq. yd.

Applying the No. 1 stone (Grade 1) at a rate of 1:69.6. The theoretical rate was 1:70.

Only a flat-wheeled roller was used in setting the No. 1 stone.



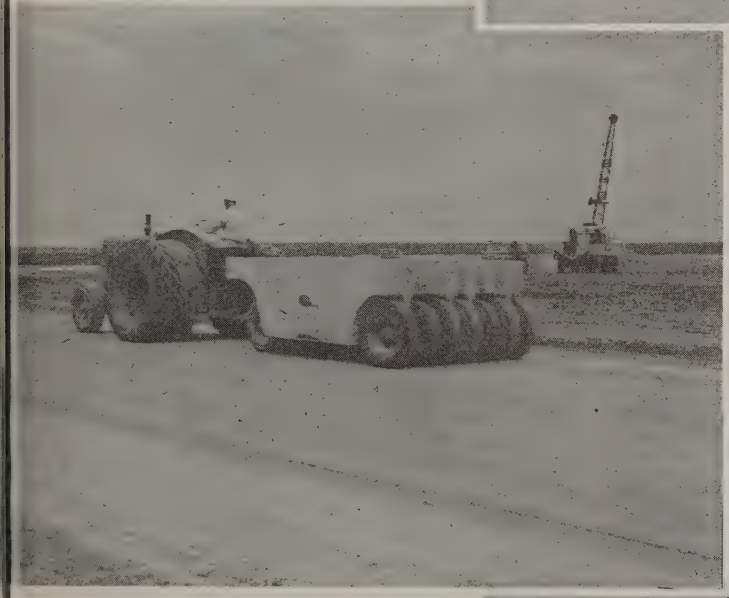
A close-up of the No. 1 stone after rolling.



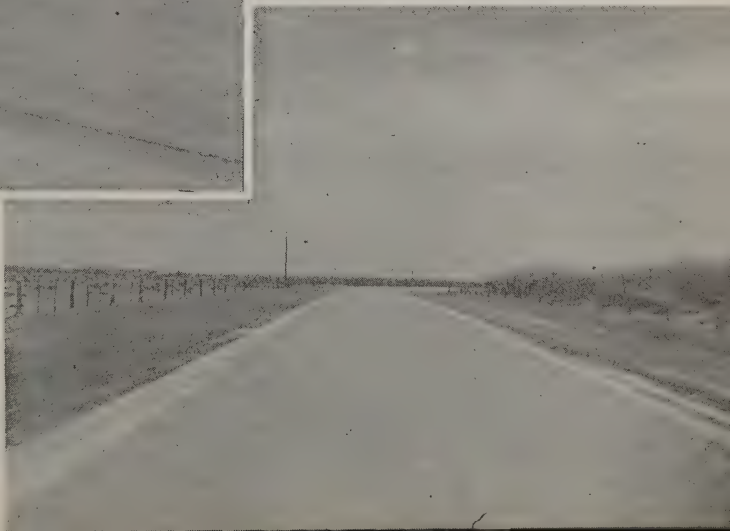
A close-up of the No. 1 stone after the application of the second course of asphalt.

Application of the second course of asphalt, OA-175, at a rate of 0.277 gal./sq. yd. The theoretical rate was 0.30 gal./sq. yd.

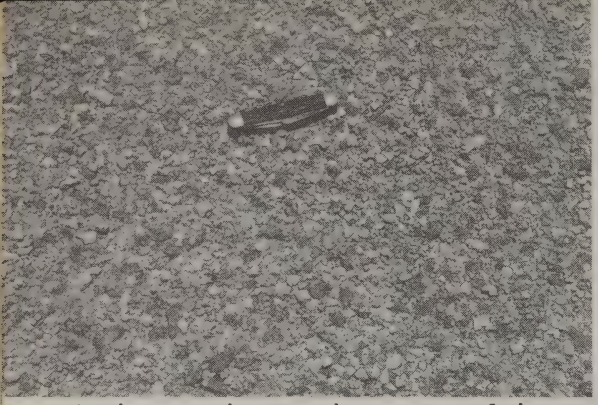
Applying No. 2 aggregate (Grade 7) at a rate of 1:113.8. The theoretical rate was 1:120.



Pneumatic rolling of No. 2 aggregate. Pictures were not obtained of the use of a light drag broom nor of the use of a flat-wheeled roller which constituted the final operation.



View of a section of F.M. 1867 after completion of the experimental double surface treatment.



A close-up showing the texture of the asphaltic surface treatment. Note that an appreciable amount of the No. 1 aggregate is exposed with the No. 2 aggregate filling the voids and making a denser mat.

Close-up of the pavement three months after construction.

The original application of the Grade 7 stone was in the amount of 1:133, but this seemed to be insufficient and an additional amount was added, which brought the total to 1:101. Again good results were obtained but the loss of the Grade 7 stone was somewhat high and it was quite evident that the rate of 1:101 was too high.

A comparison of the above table with the one from the section on U. S. 90 indicates only a slight variance in the total amount of asphalt on the four comparable sections but with about 0.10 less, and equal amount more, between the first and second applications. Had it not been for the addition of the extra amount of Grade 7 stone, we feel that there would have been little or no loss of this material, as will be evidenced on a subsequent project.

In the summer of 1953, Holland Page of Austin had under contract the construction of Farm Highway 1867, extending from a connection with Farm Highway 1025 in Zavala County southeast to Loma Vista, a distance of 3.43 miles. The original contract provided for the construction of a single bituminous surface treatment, but after consulting with Mr. Page he very courteously and generously agreed to the execution of a supplemental agreement providing for the construction of a light double at the same unit prices he had quoted for the asphalt and stone. The new specifications provided for two applications of asphalt in the amounts of 0.10 and 0.30 gal./sq.yd., respectively, and the application of Grade 1 stone in the amount of 1:70 and the Grade 7 stone in the amount of 1:120. The light double was constructed in July, 1953, under ideal asphalt weather — hot and dry. The final results insofar as the actual materials are concerned showed the asphalt applications to be 0.1109 and 0.277 gal./sq.yd. and the stone to be 1:69.6 and 1:114.

The results were excellent and there was little or no loss of either the Grade 1 or Grade 7 stone. In fact, on a subsequent visit to the project some few months after completion Mr. Freeborough estimated the total loss as being less than 1 per cent of both grades.

From the above it will be noted that approximately 20 per cent less of asphalt was used on this project than is generally used on a project similar in design and yet, with a material having a high affinity for asphalt, equal or better results were obtained. In part this may be attributed to the excellent weather conditions prevailing at the time, but there is no question in the minds of most of us but that the aggregates used had a distinct bearing on the results to be expected.

In the writer's opinion there are many factors involved in the securing of good asphalt surface treatments — such as weather, methods used, the correct amounts of both asphalt and aggregate, and last but not least the aggregate to be used. We are fortunate, thanks to our Construction Superintendent, M. F. Lowe, in having an asphalt crew that really knows when and how to apply asphalt and secure the best results possible.

WHITE COVER STONE

Roy Johnston, Senior Maintenance Superintendent
District 19

Some of the districts are using white cover stone on driveways surfaced with asphalt in roadside turnouts. This difference in color acts as a safety feature by showing that it is not part of the highway.

This particular turnout is located on U. S. 59 in Cass County, near the Marion County Line.

Tentative PROGRAM

Twenty-eighth Annual Short Course in Highway Engineering

TUESDAY, SEPTEMBER 7

Morning: Ballroom Memorial Student Center

8:00 Registration, Memorial Student Center

Chairman: Dr. S.R. Wright, Head
Civil Engineering Department
A & M College of Texas
College Station, Texas

10:30 Invocation: Rev. Norman Anderson, Pastor
A & M Presbyterian Church
College Station, Texas

Address of Welcome
Dr. David H. Morgan, President
A & M College of Texas

Response
Tyree L. Bell, President
Austin Road Company
Dallas, Texas

11:00 Texas Highway Needs
E. H. Thornton Jr., Chairman
Texas Highway Commission
Galveston, Texas

11:30 A Look Ahead
Pyke Johnson. President
Automotive Safety Foundation
Washington, D.C.

Afternoon: Ballroom Memorial Student Center

Chairman: Frank W. Cawthon, District Engineer
Texas Highway Department
Dallas, Texas

1:45 The Nation's Highway Future
D.C. Greer, State Highway Engineer
Texas Highway Department
Austin, Texas

2:15 Highway Construction Future
E. B. Cape, President
Gulf Bitulithic Company
Houston, Texas

Intermission

3:00 Highway Loadings
Henson K. Stephenson, Research Engineer
A & M College of Texas

3:30 The Malad Test Road
Frank H. Scrivner, Supervising Research Engineer
Texas Highway Department
Austin, Texas

4:00 Future of Highway Short Course
Fred J. Benson, Professor
Civil Engineering Department
A & M College of Texas

7:00 Annual Banquet, Sbisa Hall
Toastmaster: D.C. Greer
Texas Highway History

WEDNESDAY, SEPTEMBER 8

All meetings in Memorial Student Center.
Rooms are shown by name or number.

PAVEMENTS SECTION

Morning: Ballroom

Chairman: Spencer J. Buchanan, Professor
Soil Mechanics and Foundation Engineering
A & M College of Texas

9:00 Compaction, Principles, and Relation to Strength
W.H. Moore, Senior Research Engineer
Texas Highway Department
Austin, Texas

J.E. Hunt, Soils Engineer
Texas Highway Department
Austin, Texas

11:00 Use of Heavy Pneumatic Rollers
Professor Spencer J. Buchanan
A & M College of Texas

Afternoon: Ballroom

Chairman: Professor Spencer J. Buchanan

1:30 Triaxial Procedure for Flexible Pavement Design
Chester McDowell, Senior Soils Engineer
Texas Highway Department
Austin, Texas

3:00 Design of Cross Section as Influenced by Edge Failure Problem
A.C. Kyser Jr., Assistant District Engineer
Texas Highway Department
Houston, Texas

STRUCTURES AND HYDRAULIC SECTION

Morning: Room 2-B

Chairman: H.K. Stephenson, Research Engineer
A & M College of Texas

9:00 Use of Lightweight Aggregates in Structural Concrete
William Shafer, Senior Concrete Engineer
Texas Highway Department
Austin, Texas

Cedric Willson, Vice-president
Texas Industries, Inc.
Dallas, Texas

10:30 Possibilities of Precast Concrete in Highway Structures
Truman R. Jones Jr., Assistant Research Engineer
A & M College of Texas

Afternoon: Room 2-B

Chairman: M.D. Shelby, Senior Soils Engineer
Texas Highway Department
Austin, Texas

1:30 Current Design Methods for Drilled Foundations
Frank S. Mitchell Jr., Laboratory Engineer
Texas Highway Department
Houston, Texas

3:00 Results of Load Studies on Drilled Shafts
L.A. DuBose, Assistant Professor
A & M College of Texas

MAINTENANCE OPERATIONS

Social Room

Chairman: L. K. Jonas, Chief Supervisor Training Program
Assisted by A. L. Kramer, Field Instructor
Texas Engineering Extension Service
A & M College of Texas

9:00 Causes of Job Accidents

1:30 Prevention of Job Accidents

Note: This program is intended for Maintenance Foremen and Maintenance Engineers particularly interested in reducing lost time and personal injury accidents. Maximum number which can be accommodated is 30.

GEOMETRIC DESIGN AND TRAFFIC CONTROL

Morning: Room 2-D

Chairman: M. V. Greer, Supervising Traffic Engineer
Texas Highway Department
Austin, Texas

9:00 Traffic Accident Data in Highway Design and Operation
W. R. Welty, Traffic Designing Engineer
Texas Highway Department
Austin, Texas

10:30 Use of Traffic Signs
P. R. Tutt, Traffic Designing Engineer
Texas Highway Department
Austin, Texas

Afternoon: Room 3-A

Chairman: W. J. Van London, Engineer-Manager
Texas Highway Department
Houston, Texas

1:30 Expressway Design Standards
Douglas A. Nettleton, Supervising Urban Engineer
Texas Highway Department
Dallas, Texas

3:00 Design for Expressway Drainage
Carl F. Izzard, Chief Hydraulics Research
Bureau of Public Roads
Washington, D. C.

CONSTRUCTION OPERATIONS SECTION

Afternoon: Room 3-D

Chairman: P. V. Pennybacker, Special Bridge Engineer
Texas Highway Department
Austin, Texas

1:30 Principles of Structural Welding

3:00 Inspection of Structural Welds
William H. Greer, Assistant Manager
Southwestern Laboratories
Houston, Texas

THURSDAY, SEPTEMBER 9

CONSTRUCTION OPERATION SECTION

Morning: Room 2-D

Chairman: R. L. Rothe, District Construction Engineer
Texas Highway Department
Lufkin, Texas

9:00 Use of Traveling Crushers to Reduce Oversize Pit Material
R. E. Stotzer Jr., Resident Engineer
Texas Highway Department
New Braunfels, Texas

10:30 Joint Seals for Concrete Pipe Culverts
W. H. Garrett, Senior Resident Engineer
Texas Highway Department
Littlefield, Texas

MAINTENANCE OPERATIONS SECTION

Afternoon: Room 2-B

Chairman: J. W. Cravens, District Maintenance Engineer
Texas Highway Department
Paris, Texas

1:30 Controlling Encroachments on Highway Right of Way
O. L. Crain, Assistant District Engineer
Texas Highway Department
Bryan, Texas

3:00 Shoulder Surfacing as a Maintenance Operation
I. H. Crutcher Jr., District Maintenance Engineer
Texas Highway Department
Tyler, Texas

Grover Green, District Maintenance Engineer
Texas Highway Department
Dallas, Texas

STRUCTURES AND HYDRAULICS SECTION

Morning: Room 2-B

Chairman: R. M. Holcomb, Professor of Structural Engineering
A & M College of Texas

9:00 Design of Welded Bridge Structures
Farland C. Bundy, Designing Engineer
Texas Highway Department
Austin, Texas

10:30 High Tensile Bolts to Replace Rivets
Wayne Henneberger, Senior Designing Engineer
Texas Highway Department
Austin, Texas

PAVEMENTS SECTION

Morning: Ballroom

Chairman: F. M. Davis, District Engineer
Texas Highway Department
San Antonio, Texas

9:00 Jointing of Concrete Pavements
A. L. Chollar, Supervising Designing Engineer
Texas Highway Department
Austin, Texas

10:00 Resurfacing with Concrete
George M. Garrett, Special Highway Engineer
Portland Cement Association
Fort Worth, Texas

11:00 New Developments in Constructing Concrete Pavements
Ted Edwards, Paving Engineer
Portland Cement Association
Austin, Texas

Afternoon: Ballroom

Chairman: O. A. Philippi, Assistant Construction Engineer
Texas Highway Department
Austin, Texas

1:30 New Uses for HVMS Emulsions
J. C. Roberts, District Engineer
Texas Highway Department
Abilene, Texas

3:00 Design of Hot Mix Pavements
J. R. Harris, Supervising Field Engineer
Texas Highway Department
Austin, Texas

Hugh A. Wallace, Division Engineer
Asphalt Institute
Dallas, Texas

GEOMETRIC DESIGN AND TRAFFIC CONTROL SECTION

Morning: Room 2-C

Chairman: Professor F. J. Benson
A & M College of Texas

10:00 Design and Operation of Climbing Lanes
Frank H. Scrivner, Supervising Research Engineer
Texas Highway Department
Austin, Texas

George C. Wall Jr., Resident Engineer
Texas Highway Department
Mineral Wells, Texas

Afternoon: Room 2-C

Chairman: F. E. Lovett, Expressway Engineer
Texas Highway Department
Fort Worth, Texas

1:30 Problems in Horizontal Alignment of Expressways
R. A. Bossy, Expressway Engineer
Texas Highway Department
San Antonio, Texas

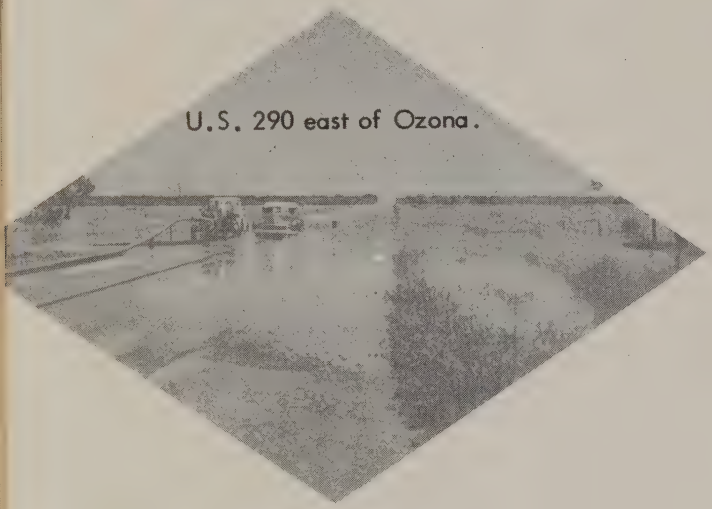
3:00 Selection of Expressway Pavement
F. A. Harris, Senior Designing Engineer
Texas Highway Department
Houston, Texas

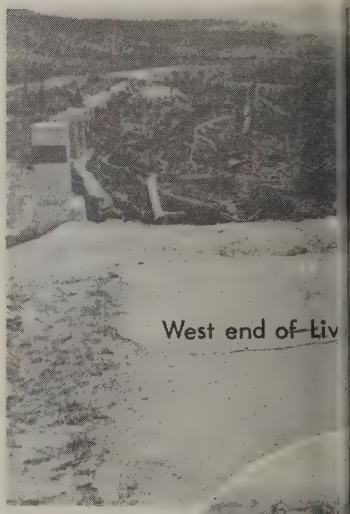
Ozona Johnson Draw

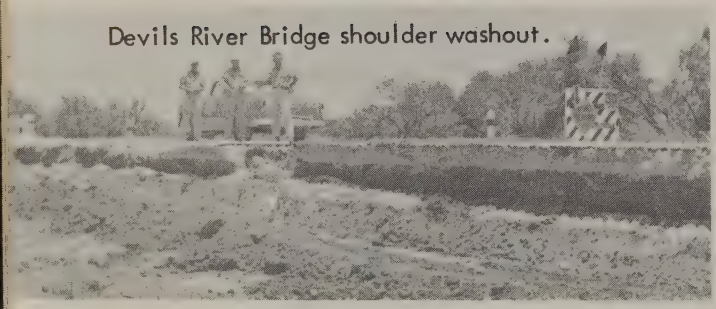
District 7

SURVEYS

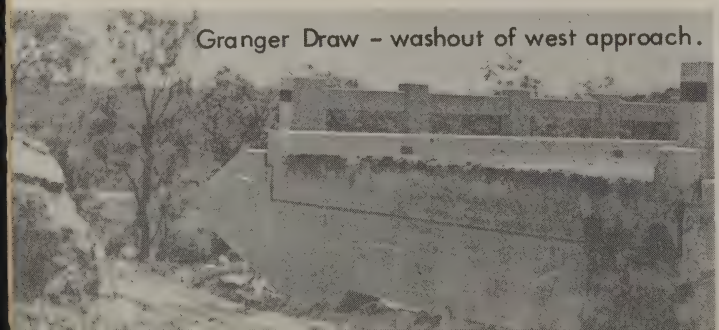
District 7 also had some flood
the primary and secondary syste
trict Reporter L. K. Willis after

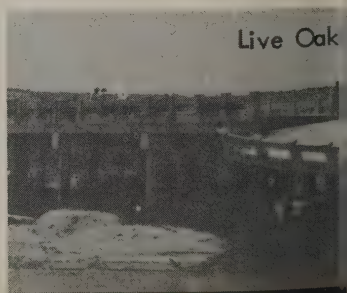

U.S. 290 east of Ozona.


West end of Liv


Devils River Bridge shoulder washout.

East


Granger Draw – washout of west approach.


Live Oak

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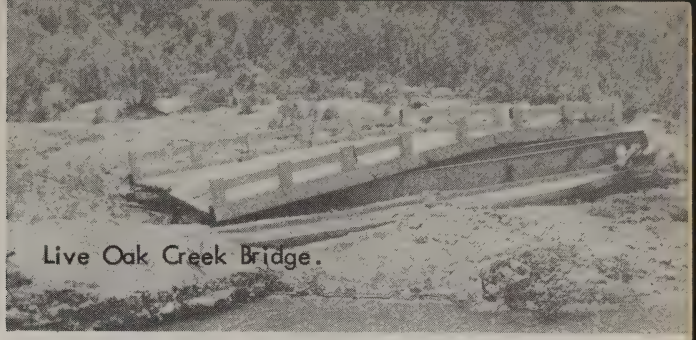
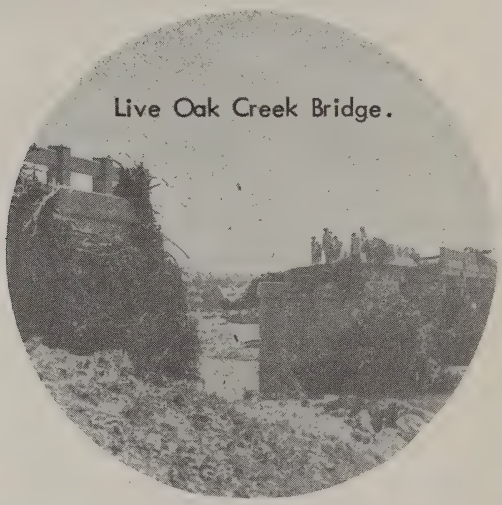
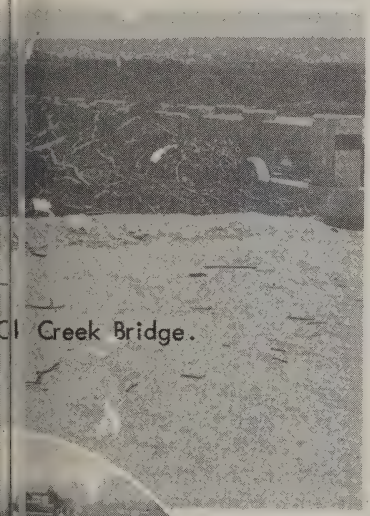


Live Oak Creek Bridge.



Live Oak Creek Bridge.



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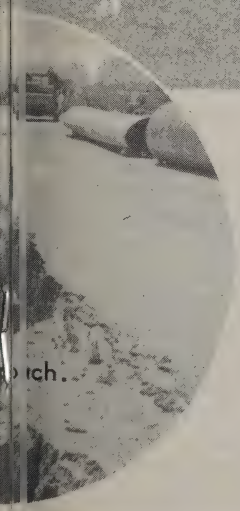

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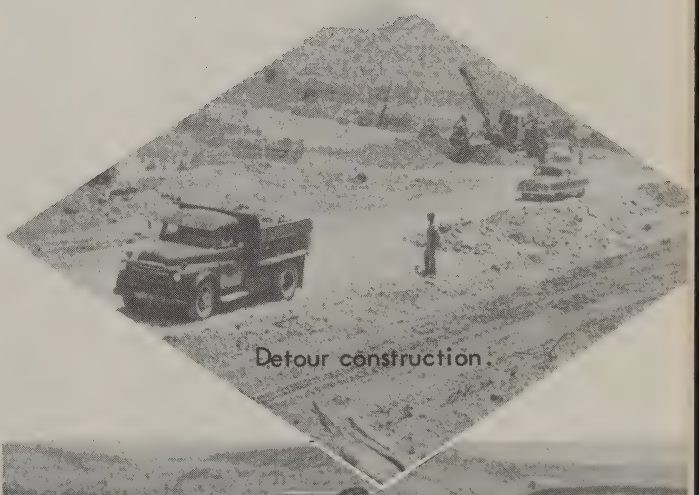
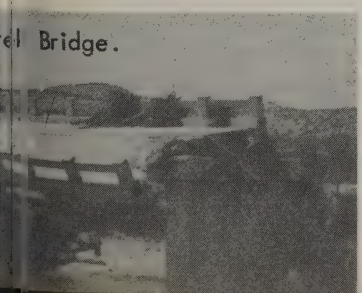


Detour construction.



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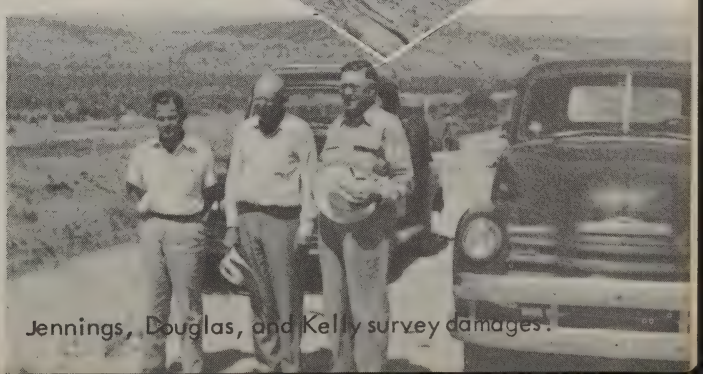


Jennings, Douglas, and Kelly survey damages.

Brazos River Bridge

REPLACING APPROACH SPANS

J.S. Griffith, Senior Resident Engineer
District 12

The Brazos River Bridge on U. S. 290 between Hempstead and Brenham was built in 1929. The main span is a 320-foot through truss; the two side spans are 130-foot through trusses flanked by eighteen 19-foot timber approach spans on each side of the river.

The traffic volume on U. S. 290 increased to a point that the cost of maintaining the timber approach spans was extremely high, so plans were made early in 1953 to replace the approach spans with a permanent type structure. Because the Brazos River bridges, both upstream and downstream, were limited to light traffic, an effort was made to keep the bridge closed to traffic only when absolutely necessary. Some sort of precast construction seemed to be the best solution. The Bridge Division cooperated with district personnel in developing a design and procedure which would accomplish the desired results. A description of the design and construction procedure follows.

DESCRIPTION OF BRIDGE: The bents are 19 foot, center to center, and are supported on two 14-inch steel bearing piling, which were driven on each side of the existing structure. The caps are welded plate girders, three feet in depth with 3/8-inch web plates, and 1 x 10 inch top and bottom flanges. The caps are welded to the piling. Six-inch WF beams were used for knee braces and were welded in place.

The precast concrete units used in the structure are 19 feet in length, 27 inches in width, and 22 inches in depth. In cross sections they are in the shape of an inverted U. The vertical legs are 3 1/2 inches thick at the bottom and 4 1/2 inches at the top. The top slab is four inches thick, the end diaphragms are four inches in thickness. The main reinforcement consists of one straight Number 9 bar placed three inches from the bottom of each leg. The diagonal tension reinforcement is welded to the top of the Number 9 bar as the legs of the unit are too narrow to use conventional stirrups. The fixed end of the unit is secured to the cap by means of a threaded sleeve which was cast in the diaphragm and fastened by a cap screw passing through the top flange of the cap.

Each span is composed of ten concrete units placed side by side. The units are held tightly together with four high tensile steel rods in each span. The rods pass transversely through the span in holes which were cast in the precast units. The friction between the precast units, created by the tension in the rods, transmits a part of the wheel load to the adjacent units, and tends to make each span act as a unit. One-half inch premolded

expansion joints were provided between the spans.

The railing is composed of a 12-inch channel supported on steel posts, which are bolted to the outside precast units, through holes cast in the units. The curb is composed of a curved plate 3/8 inch in thickness and welded to the rail posts. The curb is 12 inches high. Due to the smoothness of the curb plate, it is believed that it may deflect a wheel much more readily than a curb with a rough surface, such as concrete.

The specifications provided that the contractor could close the bridge to traffic for only eighteen working days and could close it only between the hours of 7 A.M. and 6 P.M., which meant that the bridge must be open to all traffic at night.

CONSTRUCTION PROCEDURE: The precast concrete units were made at the bridge site. The forms for the units were constructed on the job by making a framework of 1 1/2-inch angles and covering with fourteen gauge steel plate. The forms were set up on concrete beds which had been cast on the ground. Each bed was made large enough to accommodate two units. Enough forms were made to pour ten units every other day, or 30 units per week. The units were not moved from the bed until the concrete had attained a flexural strength of 500 pounds per square inch. A total of 360 units of this type were cast. Four lifting lugs, made from 1/2-inch reinforcing steel, were cast in the units to permit easy handling and to prevent damage to the unit as they were being moved. They were picked up with a truck equipped with an A-frame, and moved to a storage area where they were kept until they were needed on the bridge.

The pile driving operations were scheduled so that all of the substructure would be completed at about the same time that the last concrete units were cast. In order to open the bridge to traffic at night, it was necessary to remove one old span at a time and place the precast units in that span before proceeding to the next one. Until placement of precast units began the bridge had been open to traffic at all times.

When unit placing was started on the bridge, it was found that they would not fit snugly enough together to allow the tension rods to be tightened, as it was feared that even a small amount of uneven pressure on the vertical legs of the unit might fracture them. The first trial solution to the problem was to provide small shims of various thicknesses to be used adjacent to the tension rods. This method was found to be impractical for unless the shims fit exactly, there would still be some adverse stresses in the concrete when the tension rods were tightened. It was finally decided to use grout between the units which would definitely assure uniform bearing throughout the length of the span. The units were installed with the shims in place temporarily so that the bridge could be open to traffic at night, and the grouting was done at a later date using the following method: With the shims in place, there was a space between the units of approximately 3/16 inch. A 1 x 4 inch board was placed under the units to cover this opening and held in place with small wire passing up through the opening. The space was then filled with dry sand to a point about six inches from the top, and the top six inches filled with grout. Due to the shrinkage in Portland Cement grout, it was decided to use Embeco as an admixture. This material was used with one part each of cement and sand, and produced a nonshrink grout which completely filled the space between the units. After the grout had set, the boards were removed from the bottom, and the sand dropped out. The tension rods were fully tightened after the grout had set for four to six hours. The grout was placed only in the top part of the opening to prevent any side pressure on the vertical legs of the units.

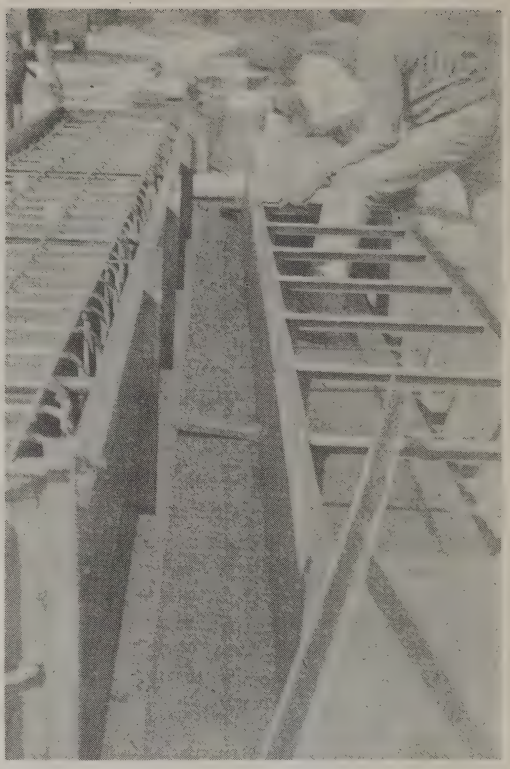
Prior to placing them in the bridge, two separate units were load-tested by applying a load equal to the dead load plus twice the live load, plus impact. The load was applied at the midpoint and quarter point with a hydraulic jack and no failure was noted.

To stay within the eighteen-day limit of closing the bridge, it was necessary to replace an average of two spans per working day. It was quite an effort to replace one span per day when the work was started, but toward the end of the job, the contractor was replacing three spans per day and the job was completed on schedule. As

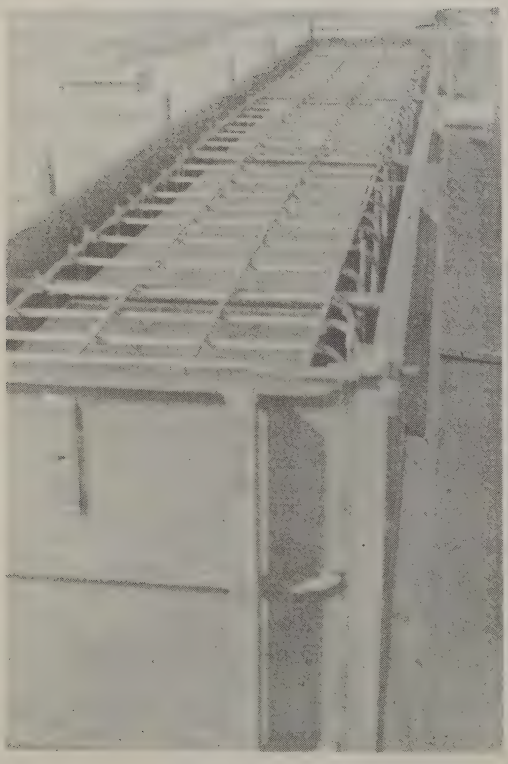
each span was placed it was necessary to install the railing. It was bolted in place temporarily and then reset to grade and alignment after the spans were all in place.

As soon as the spans were in place and the grouting completed, a surface of asphaltic concrete was applied by the highway maintenance forces. Since the surface of the precast units was level across the bridge, the roadway crown was attained by increasing the thickness of the surfacing material at the center line.

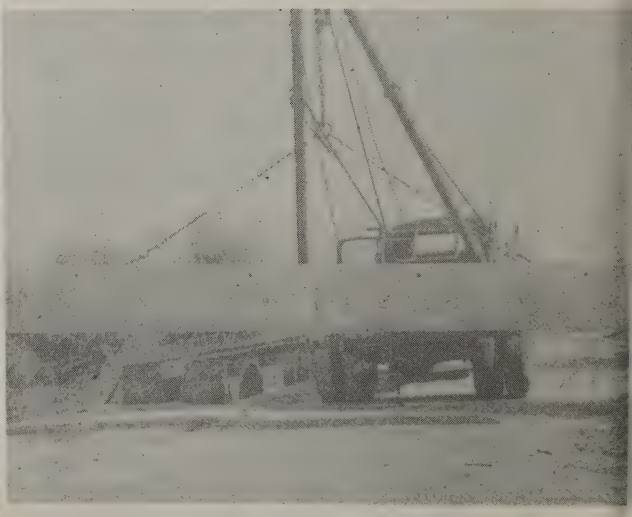
The use of this type of construction was a good solution to the traffic problem as the traffic over this section of road was saved many weeks of detouring considerable distances.



Metal forms under construction. Partially completed inside shell is shown on right. Completed form is on the left.

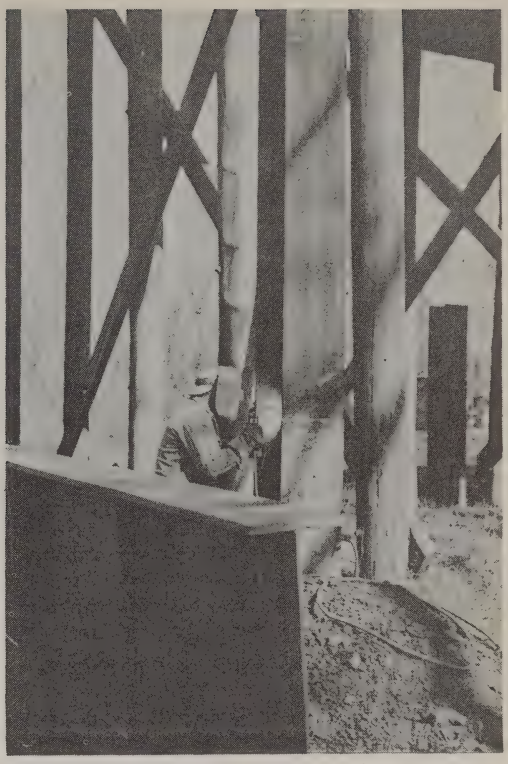


Completed form.



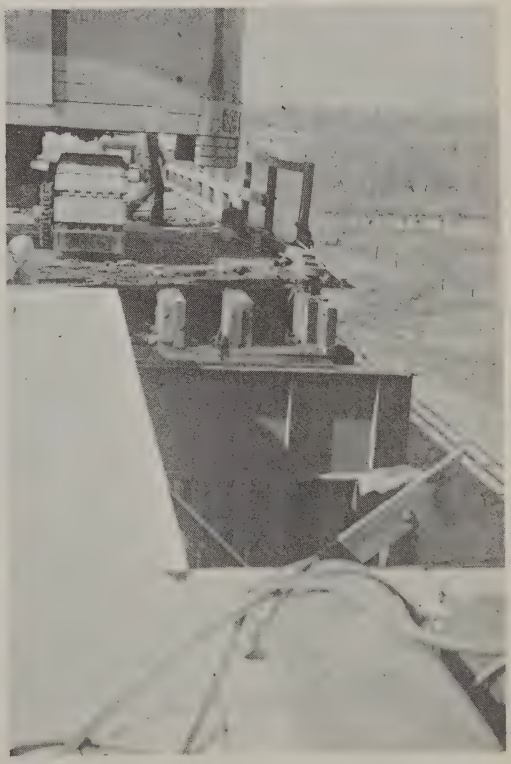
Pictured is method of handling completed units. Note holes for high tensile steel rods. Four lifting brackets were cast in the unit for ease in handling.

Pile driving operations. The clearance between the new piling and the old structure was very small.

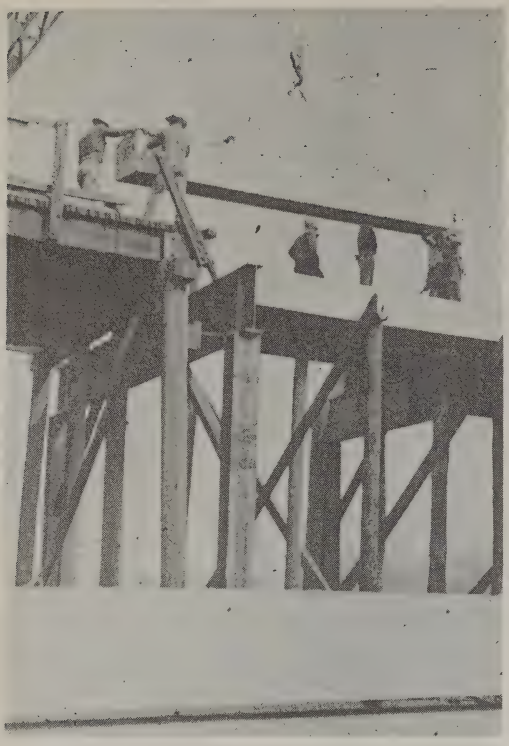


Welding pile splice. Note built-up cap in foreground.

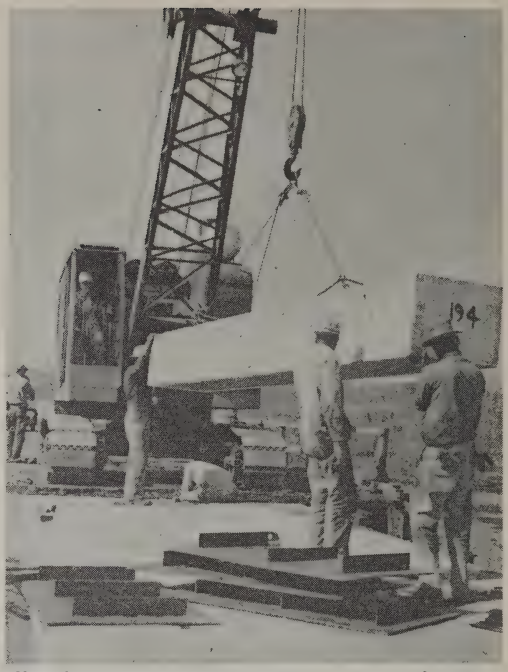
Piling completed. Caps on ground ready to be placed on piling. All substructure work was completed without disturbing the old structure.



Partially completed span. Three spans were removed and replaced on some days.

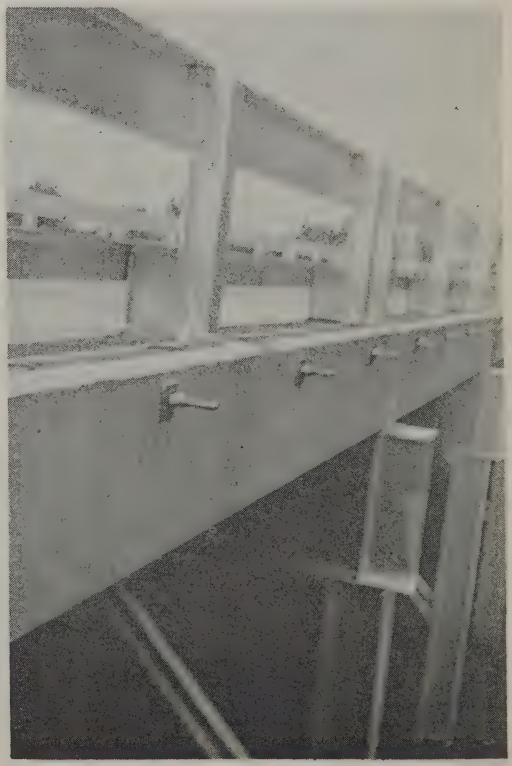


Lifting concrete unit into place. Each unit weighed approximately 5,000 pounds.

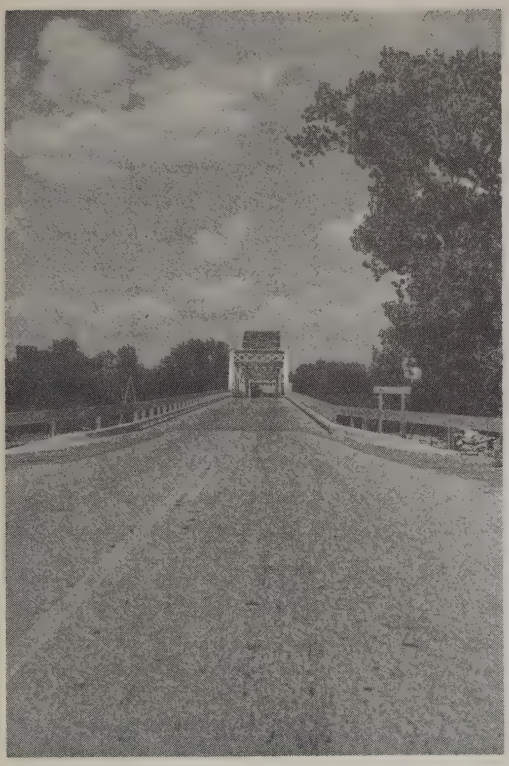


Checking concrete unit for irregularities before placing. Note steel plates in foreground for spanning opening between old and new spans to allow traffic to use bridge at night. All units were numbered for identification purposes.

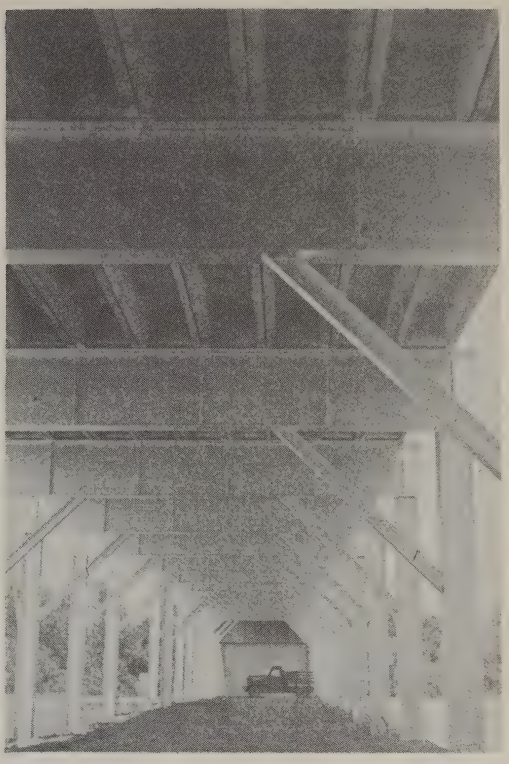
Installing high tensile steel rods after all units in span are in place. Note lifting lugs in foreground which are cut off before asphalt surface is applied.



View along outside of bridge showing arrangement of tension rods and railing.



Completed structure showing substructure and bottom of precast units.



Completed structure, west side of river.

"Keep quiet, Fezby, I'm trying to pick up a couple of spicy ones to tell at the short course!"

District 21 Button Collectors

Truck drivers with the Department have probably one of the most hazardous jobs in the organization to perform. They must drive in all kinds of weather conditions, over all sorts of highways, on construction sites, and in heavy city traffic, and stay behind the wheels of their vehicles for many hours at a stretch. It would be only natural to suppose that these drivers would be exposed to more accidents than other highway personnel and therefore, would have more mishaps than office workers. However, this is not the case. Witness the three awards given recently in District 21, each representing sixteen years of truck driving without an accident of any kind.

These outstanding safety records were recorded by Joe Costly of Falfurrias, and Refugio Guerra and Alejandro Gonzales of Laredo, who were presented with certificates and buttons by J. F. Snyder, District Engineer at Pharr, recently at a safety meeting. At these meetings, held by maintenance sections, awards for shorter periods of safe driving were also presented to several other truck drivers from various sections of the District.

Joe Costly, who has the longest record of service with the Highway Department, will receive his 30 year Service Award with the November-December award group in Austin. In the accompanying photograph, Costly is wearing a nylon shirt with buttons which consist of 10, 11, 12, 13, 14, and 15 year Safe Truck Driver Awards while on the collar are 20 and 25 year Service Award buttons.

Refugio Guerra has compiled almost as impressive a number of years with the Department, and will receive his 30 year Service Award in 1955. Alejandro Gonzales is just a youngster compared to the other two, having been with the Department a "mere" nineteen years.

Texas Highways is pleased to take this opportunity to commend these three men for their outstanding safety and service records and to congratulate them for their fine examples of safe driving practices and devotion to duty.

Joe Costly sports a collection of eight buttons - is working on Number 9.

Refugio Guerra will collect his 30-year award next year.

Alejandro Gonzales - "Junior" of the trio with only nineteen years of service.

• • • •

Personnel Changes

H.L. Arno, Director of Personnel

District 5
County Residency, Lubbock: J. W. Stevens, Senior Designing Engineer, resigned May 11, 1954.

District 18
District Headquarters, Dallas: Fred D. Holt Jr., changed from Designing Engineer to Senior Designing Engineer July 1, 1954.

Materials and Tests Division, Austin
Johnson Gault changed from Administrative Aide to Senior Administrative Aide July 1, 1954.

TEXAS ROAD MILEAGE SUMMARY

As of August 1, 1954

Mileage of State and County Roads 199,129

STATE HIGHWAYS

FA---- 15,953.77
FAS--- 9,662.90 - (Of this 842 Mi. are new hwys. since Sept., 1945)
NonFA- 693.20
Total- 26,309.87

Designated but not yet under maintenance 387.53
Marked & Maintained 25,922.34

*Urban-City Maint. Paved: 139.10
*Urban-State Maint. Paved: 2,175.75
Rural-State Maint. 23,607.49

Earth 133.97
**Metal Surface 17.88
Paved 23,455.64

FARM TO MARKET ROADS

FAS--- 15,238.85
NonFA- 9,539.04
Total- 24,777.89

Designated but not yet under maintenance 4,005.88
Marked & Maintained 20,772.01

*Urban-City Maint. Paved: 18.70
*Urban-State Maint. Paved: 509.19
Rural-State Maint. 20,244.12

Earth 91.75
**Metal Surface 39.47
Paved 20,112.90

TOTAL HIGHWAY SYSTEM

FA---- 15,953.77
FAS--- 24,901.75
NonFA- 10,232.24
Total- 51,087.76

Designated but not yet under maintenance 4,393.41
Marked & Maintained 46,694.35

*Urban-City Maint. Paved: 157.80
*Urban-State Maint. Paved: 2,684.94
Rural-State Maint. 43,851.61

Earth 225.72
**Metal Surface 57.35
Paved 43,568.54

Dustless road mileage in State:

County System ... 9,358
State System ...46,411

Total 55,769

Total street mileage in all Texas incorporated cities . . . 28,307

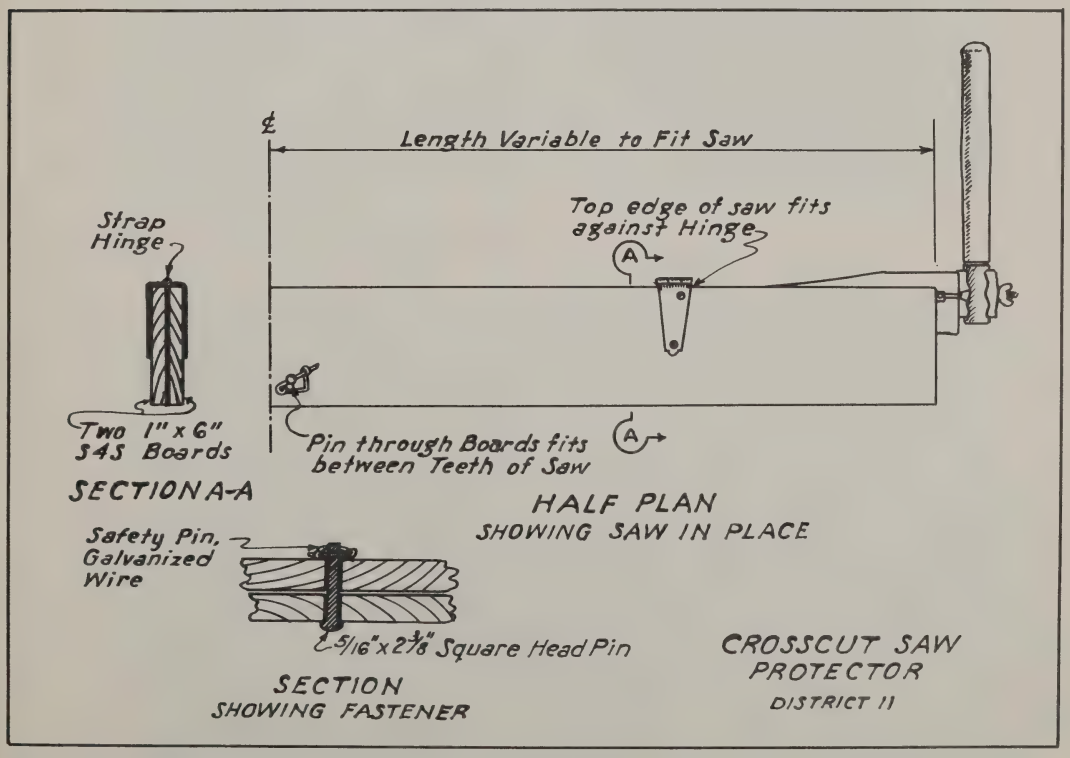
* Urban refers to mileage within incorporated cities.
** Metal includes gravel, caliche, shell, etc.

SAW PROTECTOR

J.M. York, Assistant District Engineer
District 11

This tracing shows the crosscut saw protector which is being used in District 11 for the protection of crosscut saws while they are being transported to and from the job. In checking, we find that protectors of this design have been in use in this District for several years. We are unable to give credit to the originator, as we do not know exactly where the idea came from.

John Lawrence, of the Insurance Division, noted their use in Sabine County and suggested to A.V. Pickard, Senior Maintenance Foreman, that readers of Texas Highways might be interested in information on the protector.



Wheels of Progress

E.M. Pritchard, Assistant District Engineer
District 6

The first three photographs could be comical and classified as contemporaries of the photos and article, "The Good Old Asphalt Days," which appeared in the April issue of Texas Highways. These scenes, however, were not comical to Highway personnel of Comanche County in District 23 until this year when this antiquated site was abandoned for the new spacious location at the north part of Comanche. This old site, 200 by 200, was leased from the City of Comanche. By plunking the warehouse in the exact center of the lot, the efficiency of the small area was greatly diminished. The scope of work increased and the materials overflowed into the adjoining property on a sort of mutual understanding basis.

While this was going on at Senior Maintenance Foreman Porter McCarroll's place of business, you might well guess where Park Huntington, Senior Resident Engineer, and his crew were homesteading. They were hanging their solar blueprints on the overhead steam pipes in the courthouse basement (one of the two usual choice locations of Resident Engineers' offices).

However, this has changed just very recently, February 19, 1954, to be exact, when an open house was held to celebrate moving to these proud new quarters. The wives of the engineering personnel served punch and cookies to a large host of friends who took time out to look over the new buildings and grounds. The Resident Engineer's office is modern throughout, and includes a soil laboratory within the building.

The building is 28 by 48 feet with white asbestos siding and slate grey composition roof. Inside it is divided into three main rooms, an office for the resident engineer, a drafting room, and a laboratory room.

The maintenance warehouse is 40 by 100 feet with a modern office, store room, and shower room with lockers. Ample parking space is provided for everyone, employees and visitors alike. The more than ample back yard is well arranged and organized for the present use as well as for future expansion. A layout plan was made and adopted while the previous property owner was gathering his corn crop, and was adhered to throughout the stages of construction. Everyone is pleased with the well-landscaped grounds and the efficient, utilitarian layout of the grounds.

At the open house, there were several displays, including a concrete test beam and the materials by weight that go into making one such test beam. Breaking of several beams to determine flexural strength was also demonstrated. Caliche base materials were displayed with explanations concerning tests made in the field laboratory and a number of linear shrinkage bars of varying colors and shrinkage factors which emphasize the fact that all good caliche is not white and all white material is not good caliche. Asphaltic concrete paving material with a test specimen and the component materials by weight that go into making one such specimen were shown, also asphalt surfacing showing a tin sheet on which was (shot) OA-175 at 0.3 gallon per square yard then covered with aggregate. Shown also were samples of aggregate used on the one-, two-, and three-course surface treatment. A cylinder specimen used in the triaxial compression test and the mold in which it was cured was also shown. An added attraction was the layout of the office work involved in the preparation of a project. On display was a right-of-way map with all conveyances, cross sections, plan and profile sheets, specifications, and estimate.

Personnel of the Department were stationed at each of the displays to answer questions.

OLD WAREHOUSE SITE.

New warehouse looking northwest across parking lot and door leading to soil laboratory.

View from highway showing spacious yard. Trees and shrubs have been planted.

New Resident Engineer's Office.

Techniques of Photography

III. Artifical Lighting

Time was when cameras, like people, went to bed at sundown. However, science has now made it possible through artificial light for both man and camera to work and function around the clock.

Let it be said at the outset that there are many pet theories on photography, regarding the type and make of equipment and methods for obtaining the best results under certain circumstances with artificial lighting. There is one basic principle, however, upon which all critics agree. That is, artificial lighting is most effective in close-up work.

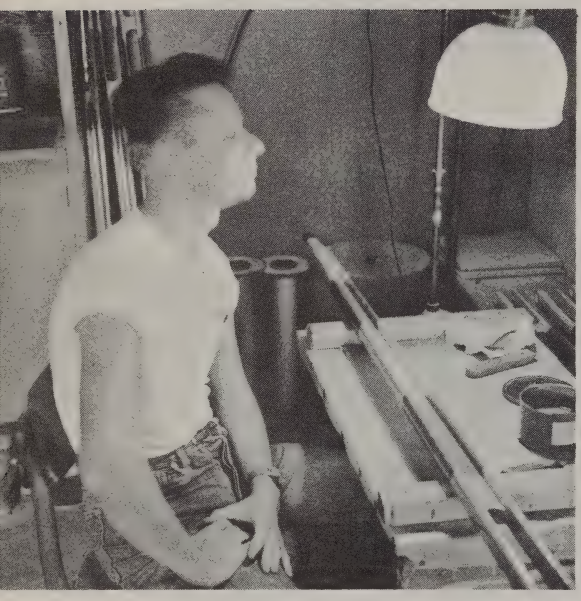
Sources of artificial light may be divided into two general classifications. The photo flash is one, and probably the most used type. The flash bulb ignites, giving off a brilliant illumination for a fraction of a second at the same instant the camera shutter snaps. The other classification of artificial light is the common flood lamp, which may be turned on and off, adjusted and placed to give interesting high lights and background to the picture.

There are various sizes of flash bulbs on today's market, however, the most economical and practical are the miniature peanut, or Press 25's. These small flash bulbs are ideal for making pictures when the background is unimportant and the subject is fairly close.

In making a flash picture, the operator of the camera should always make sure that the light will be thrown on the subject. Often in flash pictures the bulk of the light is to one side of the picture instead of being concentrated on the subject. This can be corrected by adjusting the flash reflector. If a camera is being used in which you have no control over the f. stop or shutter speed, you simply open the shutter for "T" or "B" and manually flash the bulb. Close the shutter after the peak of illumination has been reached. You can obtain surprising results in this manner using a simple and inexpensive camera with a flash.

If your camera has various controls for regulating shutter speed and aperture opening and can be focused, then you should carefully follow the manufacturer's guide which is furnished with the flash bulbs. Flash photography can also be used effectively in some outdoor shots where minute details are desired in a close-up. For example, if a sharp image is wanted of a subject which is shaded in spots, the flash will bring out the otherwise dark areas. When using a flash outdoors, for all practical purposes the setting for the camera should be based on your reading for the natural lights available and no special adjustments or compensations made for the flash.

These pictures were made indoors without benefit of artificial light by means of a time exposure. The only catch to making indoor pictures with time exposure is that all subject matter must be stopped, otherwise the picture will appear blurred.



Note above, subject remained still, and left, slight movement of head caused blur on the face of the subject.

Jimmy Griffin of Equipment and Procurement at Camp Hubbard posed for these shots.

For portrait or indoor photography at its best, flood lamps are a must. Standard flood lamps can be purchased economically at any photo shop, and the stands and other accessories needed will depend on your ingenuity in developing make-shift stands for mounting the floods. Most standard flood lamps will fit into any common light socket, and any type holder or stand can be improvised to hold the lamp at the proper distance. In using floods, the camera should be adjusted as if you were making an outdoor picture.

A light meter should be used for measuring the intensity of the light and obtaining the proper camera settings. If you do not have a light meter, refer to the guide enclosed with the film to determine the camera settings.

The exposure is based on the strength of the light, the presence of reflecting surfaces, the distance of the light source from the subject, as well as the tone of the subject, and, of course, the speed of the film. Light reflected from light-toned walls in a small room will boost the total illumination reaching the subject. Dark walls have the opposite effect.

The farther away the light source is from the subject, the longer the exposure necessary. For example, a lamp four feet from the subject will call for an exposure one-fourth of that needed if the lamp was placed at twice this distance.

High lights and shadows give interest and life to a photograph. Just as you strive for these effects in daylight shots, you should do likewise in

Mrs. Marjorie Gillespie, of Operations, is our model in the above pictures.

The ideal backdrop for this type of picture, however, would have been something which would have photographed as a grey tone, since the black backdrop does not give sufficient contrast around the head of the subject, and the white goes to the other extreme.

Background is important and will affect the outcome of pictures. These pictures were made by using flash with identical settings on the camera. Note how the white backdrop caused the picture above to be overexposed, while the black backdrop in the picture at right gave proper exposure.

indoor pictures. We dislike listening to a person who talks in a monotone. The same is true in a picture. We dislike seeing a picture without color tones, that is, void of high lights and shadows. Artificial lighting, both floods and flashes, properly used permit the photographer to exercise a maximum of control over shadows and high lights in the picture.

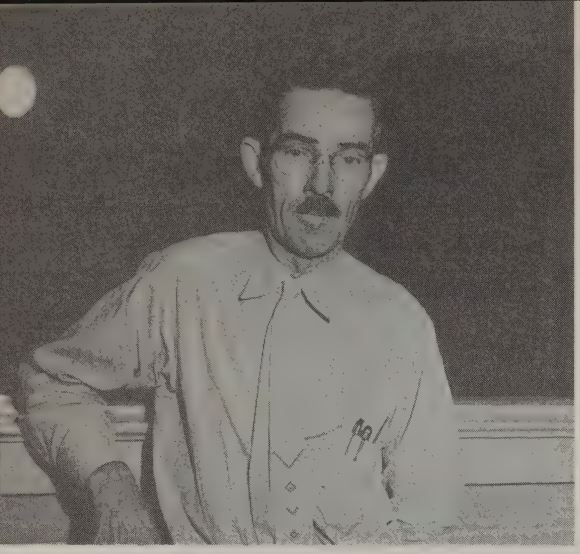
Man's treasure chest of knowledge and techniques developed because of his inborn curiosity. By nature we are curious and like to exercise our imaginations, whether we are fixing a lawn mower or taking a picture. Interesting pictures arouse our curiosity by leaving something to the imagination. Shadows coupled with a variety of tones are the features that create interest by causing us to pause and think when viewing a particular scene.

It is possible to make a picture too perfect. This is especially true in portraits and extreme close-ups of people. One so sharp that it shows every undesirable wrinkle or the other imperfections common to most people is not as desirable as a photograph that does not show every little blemish. This does not mean that a portrait should be blurred or out of focus, but by controlling the high lights you can have a sharp picture, and at the same time cover up many little imperfections. Some photographers employ the "bounce" lighting technique in making portraits and extreme close-ups of people. This is done by choosing a room with light tones, aiming the flash at the overhead ceiling, and permitting it to bounce back on the subject. This gives a soft picture and eliminates the usual dark shadows on the person caused by the direct beam of light.

In certain close-up shots it is often necessary to forget interest and beauty and concentrate on obtaining the sharpest image possible. These pictures are usually made to show in minute detail various features explaining or telling a story, rather than to portray interest or beauty.

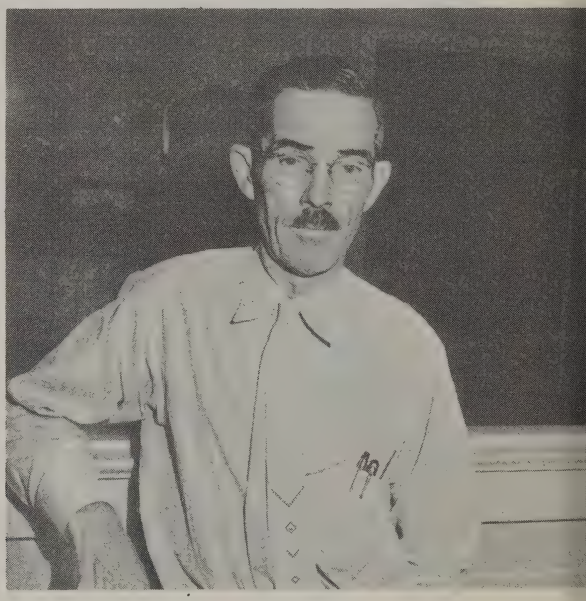
It is also possible to make pictures indoors using normal house lighting by giving the film a time exposure. The disadvantage here is that any slight movement of the subject or camera will blur the picture. Stationary scenes can be photographed very effectively in this manner.

Color, black and white, motion or still all react the same under artificial light. As a rule, the most popular color film is the daylight type. This can be shot outdoors under natural sunlight, or used indoors with the



The flash should be centered on the subject. Note the difference in pictures 5 and 6.

Number 6 shows flash centered on subject, while 5 shows flash reflecting bulk of light to upper left of subject.



O.S. Ingle is the subject in these two pictures.

special blue artificial light without filters on the camera. It is necessary, however, to use the special blue lamps or flashes rather than the incandescent light with the daylight type color film. The Type "B" in roll film or "A" in cut color film is recommended over the daylight type for indoor use since it requires regular photo floods. However, it is necessary to use a special filter when using Type "A" film outdoors under natural lighting conditions.

The results in color film using artificial lighting are often disappointing, and this phase of photography is suggested for the advanced students of the "shutterbug art." Very seldom will you get the same brilliant contrasting colors on indoor shots, regardless of the type of film or artificial lights used, as you obtain outdoors with natural lighting.

There are several types of artificial lighting equipment on the market. Each manufacturer includes literature explaining how to use, and obtain the best results from, his particular product. The manufacturer also includes special instructions for using his particular film under artificial light. The best advice, other than a few basic rules which have been discussed in this article, is that when you are ready to try making pictures under artificial light, be sure to read and follow the manufacturer's instructions which come with the lights and the film. You'll be both surprised and pleased with the results . . . .

. . . Yesterday I drove from Texarkana to Mount Pleasant and returned by Atlanta.

Of course, I knew the roads to be excellent from past experience.

What was far more noticeable was the neat condition of the right of way. The right of way along the whole route was as "neat as a pin," as was also from Marshall to Shreveport, a trip made a few days ago.

I congratulate you!

R. T. Douglas
Gilliam, Louisiana

. . . Please accept our thanks to your organization for the superior work being done. We have just returned from a short trip which took us through several western states and we did appreciate the Texas highways when we returned again.

In California the roads were good, but they did not have the extras we find here, such as the clean shoulders and the many, many roadside parks. Their shoulders were a steady stream of cans and bottles and other rubbish. Also, we did appreciate and use the roadside parks, especially out where the water is scarce, and we always found that at one of these parks.

Don Wertz
Bay City, Texas

. . . We think Texas is terrific. Thanks so much for those incomparable roadside parks . . .

K. E. Foster
Phoenix, Arizona

. . . I have just returned from a motor trip through Texas and many other of our western and middle western states. Nowhere did I find such fine roads, so many roadside parks, and such effort toward beautification as in Texas. You are to be congratulated for a fine job. I am sure that a high percentage of the tourists who visit Texas return again and again. You have made them feel at home and have seen to their needs.

I was particularly impressed by the quality and frequency of your roadside parks. It would be hard to find a better way to please the tourist.

I was also pleased to see fewer billboards than in most states. One cannot enjoy the magnificent western scenery if it is marred by billboards, junk yards, and the like.

You have done a fine job, and best luck on your future progress.

John V. Dennis
Leesburg, Virginia

. . . I feared the miles and miles of land where I saw no buildings or human beings, just occasionally a car . . .

Nashville, Tennessee

. . . Traffic signals in the center of the intersections are hard to see. Should be on the corners . . .

Claremont, California

. . . We like your new map and your good secondary road system . . .

Forest, Mississippi

. . . We liked your wide highways and shoulders level with road, and your tax free state . . .

Marathon, Florida

. . . We didn't like your apparent lack of control of right of way in State Highway Department . . .

Whittier, California

. . . We were impressed with the lack of advertising signs along some of the roads and the divided highways leading into the larger towns . . .

Laramie, Wyoming

IN MEMORIAM

John R. Duke, semi-skilled laborer in District 1, was instantly killed when the top of a dead tree he was attempting to push over with a bulldozer snapped and fell on him.